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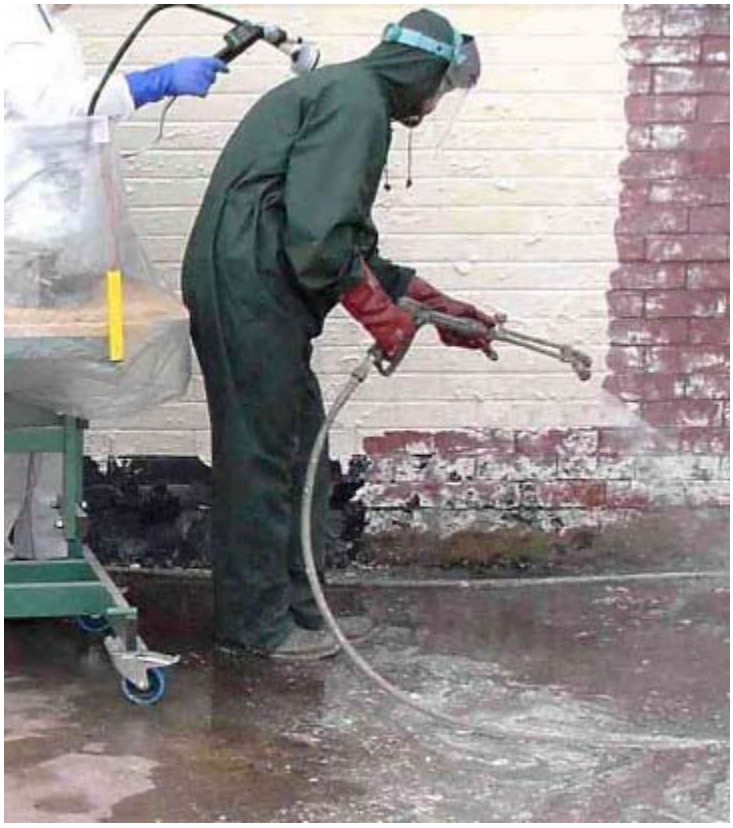
Atmospheric monitoring for methylene chloride during paint removal from external façades

Previous studies have demonstrated that the general public is not at risk from small amounts of methylene chloride paint removers used to renovate indoor woodwork during home improvement projects. Atmospheric monitoring of methylene chloride concentrations during this use has clearly demonstrated that these operations do not lead to the formation of dangerous concentrations of methylene chloride if the room is well ventilated. This is due to the incorporation of special vapour retarding additives in the paint remover formulation.

However, concerns have been expressed that professional use of methylene chloride paint removers might represent more of a risk to the operator-particularly when cleaning building façades, because of the larger quantity of paint remover used and the larger areas being treated.

Photograph 1: Application of the paint stripper with a brush

UK methylene chloride paint remover formulators have carried out a study of the methylene chloride concentrations encountered whilst using vapour retarded paint removers on an external façade. The study, carried out at a UK site during April 2003, was based on a professional building renovation company using methylene chloride based paint removers and methods typical of the industry. Two walls were stripped, one with and one without protective sheeting. Various removal methods were evaluated including scraping, hot water washing and vacuum washing, but the major method used for the paint removal was hot water washing.



Photograph 2: Removal of the paint dissolved in the stripper with a hot water spray gun

The monitoring results, obtained and analysed by ISO 17025-accredited laboratory UKAS, using a portable infrared detector and passive adsorption monitors, demonstrated that exposure levels to methylene chloride were well below UK statutory limits and not considered acutely harmful to the health of the operator.

The effect of vapour retardation was dramatically demonstrated in the enclosed section of façade where a rapid drop in atmospheric methylene chloride vapour concentration was observed following the application of paint removers. The vapour concentration remained low during the subsequent periods of static monitoring.

Typically workers spend no more than 4 hours at a time carrying out paint stripping operations, whether applying, removing or cleaning. It would be normal to strip about 20 m2 of surface per day using two coats of paint remover. UK professional companies confirm that this work profile is representative. Extrapolating the

exposures measured during this work gives a worst-case exposure well under the Occupational Exposure Limit of 100 ppm.

In summary, this work has demonstrated that vapour retarded methylene chloride paint removers can be used for professional façade renovation without posing an acute hazard to the operator's health.

Poison Centre survey of methylene chloride

In 1998, DG Enterprise of the European Commission decided to undertake a study of the advantages and drawbacks of market restrictions on methylene chloride. TNO was awarded the contract and in 1999 produced an extensive document pointing at some concerns in three consumer markets: aerosols, paint removers and adhesives. As a consequence, DG Enterprise looked at possible restrictions on the marketing of paint strippers.

In order to address these concerns, ECSA has launched two separate enquiries among some 55 poison centres spread throughout West and Central Europe. The first enquiry in 2000 focused on incidents relating to methylene chloride in all three applications highlighted in the TNO report. In 2002, a second enquiry looked at chemical alternatives of methylene chloride in paint stripping. The rate of reply was 40%, with responses received from 21 countries.

The results can be summarised as follows.

1. **The number of incidents reported to poison centres related to methylene chloride is limited**, especially compared to the number of units of paint stripper sold. There are other chemicals of much greater concern. However, the absence of incidents with methylene chloride in some countries might be due to deficiencies in the reporting system or to the fact that enquiries are based on trademarks and not chemical substances.
2. **When there are incidents, they are mostly benign**. Only a few serious cases were reported, and then they stem mainly from professional use, when workplace safety standards were not implemented, or from misuse, like ingestion despite warning labels and instructions.
3. **When there are severe incidents, they are often due to hazardous substances accompanying methylene chloride** in some paint strippers. For example, serious skin irritant/corrosive effects are due to other components, such as hydrofluoric acid. However, methylene chloride itself might cause a severe irritant effect if the exposure is occlusive and prolonged-so each case needs to be assessed carefully.
4. **Alternatives to methylene chloride present their own and different risks**, whether they are solvents or alkalies or mechanical methods. In the few Centres where data have been reported for other paint strippers, there are usually no more incidents with methylene chloride than with the alternatives. In these countries, incidents with alternatives have been shown to be more severe than with methylene chloride.
5. **Adequate ventilation is the best protection against high exposure**. Furthermore, many incidents could have been avoided by the use of appropriate protection devices recommended by the manufacturers of paint strippers, such as gloves, spectacles, mask, and breathing apparatus if a large amount of product is used.

This reinforces the opinion of ECSA that "*experience demonstrates that there have not been any negative effects on the estimated risk to consumers from the use of methylene chloride in adhesives, aerosols and paint strippers, as long as it is used under the right conditions. Therefore no additional measures are required*."

The detailed results of the Poison Centre survey are available on request from André Orban at the address on the last page of this issue.